STREPTOCOCCAL PHARYNGITIS: WHAT DO PARENTS KNOW?

by

Sharon K. Hillard

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SUPERVISORY COMMITTEE APPROVAL

of a thesis submitted by

Sharon Hillard

This thesis has been read by each member of the following supervisory committee and by majority vote has been found to be satisfactory.

Chairman: Christine

M. Suza a

Gary M.

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FINAL READING APPROVAL

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I have read the thesis of Sharon K. Hillard in its final form and have found that (1) its format, citations, and bibliographic style are consistent and acceptable; (2) its illustrative materials including figures, tables, and charts are in place; and (3) the final manuscript is satisfactory to the Supervisory Committee and is ready for submission to the Graduate School.

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Date

Christine Gillies
Member, Supervisory Committee

Approved for the Major Department

Linda K. Amos
Chairman Dean

Approved for the Graduate Council

B. Gale Dick

ABSTRACT

This study sought to determine the level of parental knowledge regarding streptococcal pharyngitis (strep throat). The sample was composed of 100 parents of children who visited the Willow Creek and the University of Utah Pediatric practices. At each site, parents were asked to provide demographic data and respond to a questionnaire which focused on the treatment, susceptibility and diagnostic aspects of strep throat. Parents scored highest on questions concerning treatment (87%). Seventy-five percent of the questions on susceptibility were answered correctly. Parents scored lowest on questions about diagnosis (68%). The leading source of knowledge about strep throat for parents was prior experience with the disease (63%). A low correlation was noted between income level and education versus correct answers. No correlation existed with other demographic variables and knowledge base. The study also evaluated whether a difference existed between what parents know and what health care providers believe parents need to know regarding streptococcal pharyngitis. A difference was found to exist on certain questions within the categories of treatment, susceptibility and diagnosis.

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CHAPTER I

INTRODUCTION

Pharyngitis is the third leading cause given by patients for office visits to health care providers. The infection accounts for over 30 million visits annually and affects both pediatric and adult populations at a cost of $300 million dollars annually (Cypress, 1978; Lowe & Hedges, 1984). Approximately 11% of all school-age (ages 3 to 11) children visit a health care provider annually with this chief complaint (Gerber & Markowitz, 1985).

Historically, streptococcal pharyngitis caused by the Group A beta-hemolytic organism has received the most attention because of its potential role in the development of rheumatic fever and kidney disease. Because of the seriousness of the acute complication (rheumatic fever), health care professionals agree upon the need for accurate diagnosis and treatment. Other valid reasons supporting prompt treatment of streptococcal pharyngitis include the prevention of suppurative complications, reduction in spread of infection and alteration of the clinical course of the disease. Suppurative complications include peritonsillar abscess, retropharyngeal abscess, otitis media and sinusitis. Both the suppurative and nonsup-

purative complications of the disease are alleviated with prompt initiation of antibiotic therapy. Antibiotic therapy is considered effective when started within 9 days of the initial symptoms. As streptococcal pharyngitis primarily affects school-age children, the knowledge parents have about the disease and its potentially serious sequelae becomes important in the initiation of health care and the subsequent treatment. Prompt antibiotic treatment can, in many cases, shorten the duration of clinical illness and period of infectivity. This allows the patient to return to school or day care sooner and also allows the parent to return to work 24-48 hours sooner. Suppurative complications may result in numerous school absences by the patient and increased time, energy and financial demands on the parent. Rheumatic fever represents the most severe and debilitating result of untreated streptococcal pharyngitis. Nearly all the acquired heart disease suffered by people under the age of 20 is caused by rheumatic fever. The resulting damage to heart valves is often fatal.

This study identified the level of knowledge parents had regarding streptococcal pharyngitis. According to the health belief model, an individual must possess a minimal level of relevant knowledge before seeking health care. This study evaluated what was perceived by the parents as important versus what health care professionals believed

parents knew about the diagnosis and treatment of streptococcal pharyngitis. This included the expected course of the disease, the treatment and the complications which arose from untreated streptococcal pharyngitis. What motivated parents or individuals to take preventive action? The source and accuracy of the information, as well as the factors that influenced this knowledge base, were examined.

Statement of the Problem

Classically, streptococcal pharyngitis presents with the sudden onset of fever, chills (without rigors) and headache. This is followed by severe sore throat associated with a beefy red pharynx with exudate and tender anterior cervical lymph nodes. Children often have nausea, vomiting and abdominal pain early in the illness (Moffett, Cramblett, & Smith 1964). However, streptococcal pharyngitis does not always present itself as a classical picture; thus, distinguishing between viral and bacterial pharyngitis clinically can be difficult, if not impossible. Because of the difficulty in making a definitive diagnosis based on signs and symptoms alone, the throat culture has remained the standard for diagnosis.

Parents need to be alerted to the fact that any sore throat, no matter how mild, needs to be medically addressed. Failure to do so not only may result in tem-

porary discomfort and inconvenience for the parent and child but also long-term serious and irreversible consequences.

A search of the literature revealed no studies which have been conducted to determine parents' knowledge regarding streptococcal pharyngitis. Educational needs are best determined by documented educational deficits. This study proposed to identify the educational needs, based on the knowledge deficit of parents of school-age children. The author investigated information parents had about strep pharyngitis and the source of this knowledge. Demographic variables were compared with level of parental knowledge about strep throat. The study also evaluated whether a difference existed between what parents knew and what health professionals believed parents needed to know regarding the topic of streptococcal pharyngitis. These educational issues surrounding parents' knowledge of strep throat needed to be addressed.

Significance for Nursing

Nursing has long played an important role in parent education, including preventive health maintenance. However, to be effective educators, nurses must first identify what educational needs exist. Nurses are educated to teach about all aspects of streptococcal pharyngitis including signs and symptoms, diagnosis, treatment and complications. Education about streptococ-

cal pharyngitis easily could become a routine part of every pharyngitis office visit. A pamphlet on streptococcal pharyngitis could be an important tool nurses could offer the parents of children who have as a chief complaint, "sore throat." Nurses could reinforce already existing knowledge while introducing new knowledge about the disease. Determining the primary sources of parents' information about strep throat will help direct future educational efforts.

Nursing has the potential for playing a significant role in educating parents about numerous aspects of streptococcal pharyngitis in children. Society will conceivably benefit as children miss fewer school days and parents request fewer sick days secondary to their child's illness. Epidemics of strep throat might be better controlled through educational intervention brought about by nurses. Nursing has everything to gain and nothing to lose by being actively involved in parent education. Increased credibility and respect for the profession of nursing will result.

CHAPTER II

REVIEW OF THE LITERATURE

Pharyngitis caused by the Group A beta-hemolytic streptococcal (GABHS) organism is of greatest concern to health practitioners. This concern is well-supported by virtue of the preventable sequela of acute rheumatic fever (RF). Present knowledge supports the notion that there is no rheumatic heart disease without a preceding episode of RF and that there is no RF without a preceding streptococcal pharyngitis (Hague, 1985). Because of the seriousness of the acute nonsuppurative complication, RF, health care professionals agree upon the need for accurate diagnosis and treatment.

Clinical Findings

Streptococcal pharyngitis (SP) has not always presented itself as a classical picture and distinguishing clinically between viral and bacterial infections has been difficult. The hallmark sign of a bacterial infection has been pharyngeal exudate which suggests a streptococcal infection. However, many viruses, particularly adenovirus and Epstein-Barr may mimic a full-blown classical case of streptococcal pharyngitis while a mild streptococcal

pharyngitis may show no sign of pharyngeal exudate. Regardless of the presence or absence of pharyngeal exudate, the streptococcal organism may be present if the throat exhibits palatal petechiae and erythema. According to Wald (1984), children progressing to rheumatic fever fell into one of three categories: (a) 1/3 third had no memorable illness, (b) 1/3 had an unremarkable respiratory illness and (c) only 1/3 were ill enough to warrant medical attention. Because of the difficulty in making a definitive diagnosis on signs and symptoms alone, the throat culture has remained the standard for diagnosis.

Other associated complications have been peritonsillar abscess, otitis media and sinusitis. Both suppurative and nonsuppurative complications have been alleviated with prompt initiation of antibiotic therapy. Antibiotic therapy has been considered effective when started within 9 days of the initial symptoms (Mandel, 1985).

Incidence of Rheumatic Fever in the United States and Worldwide

In recent years, the aggressive approach and justification to the treatment of SP was questioned. Since the modern approach to managing pharyngitis in children began in 1950-51, the incidence of RF in the United States has declined steadily. Many reasons have been suggested for the dramatic decline of RF such as a change in the host, changes in the streptococcal organism and increased

standards of living, including the availability of comprehensive medical care and antibiotic therapy. It also has been suggested that the decline could be part of a cyclical pattern of increases and decreases in the incidence of streptococcal infections. If, indeed, a cyclical pattern exists, a future rise in streptococcal pharyngitis and possibly RF could be anticipated (Gerber & Markowitz, 1985; Gordis, 1985).

A recent outbreak of RF in the intermountain area has shown direct variance with this nationally declining trend. During an 18-month period between January 1985 through June 1986, Utah reported 87 cases of rheumatic fever. Seventy-four of these cases were seen by the cardiology staff of Primary Children's Medical Center (PCMC) of Salt Lake City, Utah. Those cases observed at PCMC during 1985 represented about an eightfold increase over the annual number of cases diagnosed in the past decade and approximately 50% increase from the highest number of cases seen in any one year during the past 25 years. Twenty-six of the 52 patients seen in 1985 resided in Salt Lake County. The incidence of RF in children 5 to 17 years of age was 18.1 per 100,000 persons (Veasy et al., 1986).

Rheumatic fever is considered to be concentrated in socioeconomically deprived minority groups (Gordis, 1985; Markowitz & Gordis, 1972; Odio, 1986). Poor housing,

crowding and lack of access to medical care seem to be significant factors in regions with a high incidence of RF. The patients in the outbreak of acute RF reported in Salt Lake County did not come from a socioeconomically deprived backgrounds, but rather from a homogeneous middle-class white population with adequate medical insurance and ready access to medical care. The average income in a limited sample of 50 families of was $34,000. This was compared to the average income of families in Utah which was $24,000 (Veasy et al., 1986).

Veasy et al. (1986) concluded from these alarming statistics that acute RF is still present in the United States and remains an important threat. Abandonment of well-established principles for treatment and recognition of streptococcal infections is not yet justified.

Worldwide, RF has remained the most common form of acquired heart disease, especially in third world countries. Although the incidence of RF in the U.S. is significantly lower than other areas in the world, the disease has remained serious, affecting 100,000 children and 1.7 million adults. The annual rate in the U.S. in 1983 was 2.9 per 100,000. More than 13,000 deaths are attributed to the disease annually (World Health Organization, 1980). Within the U.S., certain population groups are at increased risk and have not shown a decrease in rheumatic fever. For example, in the Navajo population

from 1962 to 1977, the annual attack rate was 12.4 per 100,000 for all ages, with the highest rate of 23.4 per 100,000 in the 10 to 14 year age group (Coulehan et al., 1980). Rates of 96.5 per 100,000 have been reported in Samoans living in Hawaii, with 50% of the patients having carditis (Chun, Reddy, & Rhoades, 1984). Recently, the Colorado Department of Health reported 14 confirmed cases of RF in the first 6 months of 1984 compared with only 2 to 3 cases reported annually in recent years (Rheumatic fever: Forgotten but not gone, 1984). From these data, Gordis (1985) made two points. First, caution must be exercised when explaining the decline in RF in the U.S. when the disease persists in certain American population subgroups. Secondly, the persistence of RF both abroad and in the U.S. should act as a warning against becoming complacent in the aggressive workup of streptococcal pharyngitis.

Other Reasons for Treating GABHS Apart from RF Prevention

Apart from the prevention of RF, other valid reasons supporting the treatment of SP have been identified. These include the prevention of suppurative complications, reduction in spread of infection and alteration of clinical course.

History has proven the value of antibiotic treatment for preventing suppurative complications of GABHS such as

peritonsillar abscess and cervical adenitis. These and other complications accounted for 13% of hospital admissions before 1940 (Schmidt, 1972). With the advent of penicillin therapy, scarlet fever patients were treated for 3 days. Suppurative complications developed in 39% of these patients. When treatment time was lengthened to 6 days, this figure fell to 5% (Jersild, 1948). Today, suppurative complications in antibiotic-treated patients are rarely seen because of the recommended 10-day treatment.

Another important, but often overlooked, reason for treating GABHS pharyngitis has been to minimize the spread of infection. A very high risk of transmission of the GABHS organism to other children exists in untreated patients who have a bona fide streptococcal pharyngitis. One study found 35% of household contacts acquired GABHS within a few days after the index case had been identified (Breese & Disney, 1956). Untreated patients often became asymptomatic within 3-4 days and upon return to normal daily activities, became an occult source of infection to others. Approximately 97% of patients with streptococcal pharyngitis became culture negative within 24 hours of starting antibiotic treatment (Randolph, Gerber, DeMeo, & Wright, 1985). However, the duration of prescribed antibiotic therapy is the most critical factor in eradicating the streptococcal organism. In the Breese study

(1953), if treatment was stopped after 3 days, the cultures became positive in greater than half the patients and if stopped after 6 days, again became positive in 34% of the patients (Breese, 1953).

Studies on the duration of treatment with oral penicillin to control outbreaks of SP infections in the armed forces showed that a 5-day course of treatment was inadequate and that a full 10-day course of treatment was necessary to assure no resurgence of the GABHS organism occurred (Bernstein, Feldman, Harper, Klingensmith & Cantor, 1954; Wannamaker et al., 1953).

The last controversial reason for treating streptococcal pharyngitis apart from the prevention of RF focuses on the clinical course. In a survey, Breese (1953) found that many practicing health professionals believed antibiotic therapy had a dramatic impact on the clinical course of SP. When throat cultures were used to diagnose streptococcal pharyngitis, a decision was made whether to begin antibiotic therapy immediately or wait for results of the throat culture. Certain factors should have been taken into consideration when making this decision. Early antibiotic therapy may have shortened the duration of the clinical illness and reduced the period of infectivity, allowing the child to return to school or day care sooner and in many cases allowing a parent to return to work 24 to 48 hours sooner (Gerber & Markowitz, 1985).

Diagnosis of Streptococcal Pharyngitis

The most experienced care provider often has had difficulty making the clinical diagnosis of streptococcal pharyngitis because of the nonspecific nature of the disease. Accurate diagnosis, therefore, is dependent on bacteriologic confirmation. However, culturing throat swabs on blood agar plates is not problem-free, specifically the 24 to 48 hour delay required to obtain culture results. This delay gives practitioners the choice of either initiating antibiotic therapy before knowing the results of the throat culture or waiting for culture results (Gerber & Markowitz, 1985). Both choices have drawbacks. Initiating therapy before knowing throat culture results causes a large percentage of children to receive unnecessary antibiotics since most children with acute pharyngitis do not have streptococcal pharyngitis (Randolph et al., 1985). On the other hand, those clinicians who wait 24-48 hours to begin antibiotic therapy pending throat culture results may be prolonging the clinical course and the period of infectivity.

New Rapid Diagnostic Tests for Streptococcal Pharyngitis

The rapid antibody tests for detection of the streptococcal organism from patients' throat swabs offer significant microbiological and clinical advantages over the traditional throat culture, although it remains

unproved for routine use. The primary clinical advantage is in the avoidance of unnecessary antibiotic therapy (Kellogg & Mangella, 1986). The group A streptococcal antigen detection method should have both a sensitivity and positive predictive value of 95% to ensure clinical utility (Rodetsky, Wheeler, Roe, & Todd, 1985). In reviewing 10 kits from eight manufacturers, Kellogg and Mangella (1986) found none of the kits, despite manufacturer claims, met the 95% criteria.

The reported sensitivity of the 10-Minute Group A Strep ID Kit has ranged from 62% to 95% (Campos & Charilaou, 1985; Slifkin & Gil, 1984). Variations in culture technique may have accounted for this broad range in sensitivity.

Both Gerber and Markowitz (1985) and the Committee on RF and Infective Endocarditis of the American Heart Association have indicated that further studies are needed before the commercially available group A streptococcal antigen detection kits can be used as a substitute for a competent culture. Kellogg and Mangella (1986) further concluded that until the kits can meet the "gold standard" for 95% confidence they should not replace a well-processed throat culture.

Treatment of Streptococcal Pharyngitis

Penicillin has remained the drug of choice, although considerable debate surrounds the most efficacious method and effective period of therapy. Eradication of the streptococcal organism can be achieved by 10 days of oral therapy or a single injection of benzathine penicillin (1.2 million units in adults and 600,000 units in children). The intramuscular route of penicillin administration has been the least expensive, most effective method of eradicating the streptococcal organism and has had the lowest recurrence rate when children are swabbed 10-21 days post-injection (Hague, 1985). A serious allergic reaction has occasionally occurred with the penicillin injection. However, a true penicillin allergy is uncommon, especially in children, and occurs in only 1% of all patients who receive it. When compliance is deemed a problem then the single injection of benzathine penicillin is recommended.

The nurse plays a crucial role in preventing noncompliance and subsequent recurrent streptococcal infections. The nurse must educate the parent about the need to continue antibiotic therapy even though the child may appear healthy and without a sore throat. To accomplish this, the nurse must identify certain factors (e.g., culture, social organization and/or religion) that might

impact health beliefs and compliance behaviors. (Hague, 1985).

CHAPTER III

CONCEPTUAL FRAMEWORK

Previous studies have identified numerous variables that impact health-related behaviors. Two conceptual frameworks designed by Becker, Drachman & Kirscht (1972) and Rosenstock (1974), have sought to explain these behaviors. The Health Belief Model (HBM), developed and investigated by Becker and Maiman (1975), has received the most attention. The original purpose of the HBM was to explain preventive health actions (Hachbaum, 1985). However, it has also been used to explain illness and sick role behaviors. The HBM proposes that individuals will seek health care only if they: (a) possess minimal levels of relevant general health motivation and knowledge; (b) perceive the condition as threatening (severe) and the individual (in this case a child) as potentially vulnerable (susceptible); (c) believe that intervention will produce positive results (benefits); and (d) perceive few barriers in taking recommended action (Rosenstock, 1974).

Sociodemographic variables, knowledge about the disease and prior contact with the disease have been considered to indirectly affect the likelihood of taking recommended preventive health action. Advice from others,

illness of family or friend and information obtained from a newspaper or magazine were also classified as modifying factors. An adaptation of a HBM produced for ill pediatric populations (Becker et al., 1974) was used in this study and is presented in the figure.

The HBM used in this study is composed of four categories, all of which influence the readiness to take recommended health action. These categories include individual perceptions, modifying factors, cues to action and intervention strategies. The concepts listed under five subheadings of the individual perception category have been altered to describe specific parental concerns about streptococcal pharyngitis. Perceived susceptibility was determined by how easily the child gets a sore throat and will get other sore throats in the future. Perceived threat was defined by school-age children who have been found to be most frequently affected by streptococcal pharyngitis infections. The category of perceived seriousness was defined by the well-known serious sequelae of RF and also how the disease may interfere with daily activities of both parent and child. Perceived benefits, which resulted from prompt antibiotic treatment, included the prevention of other family members contracting the disease, the child feeling better faster and the parent and child being able to return to daily activities of work and school sooner. The last category, perceived barriers,

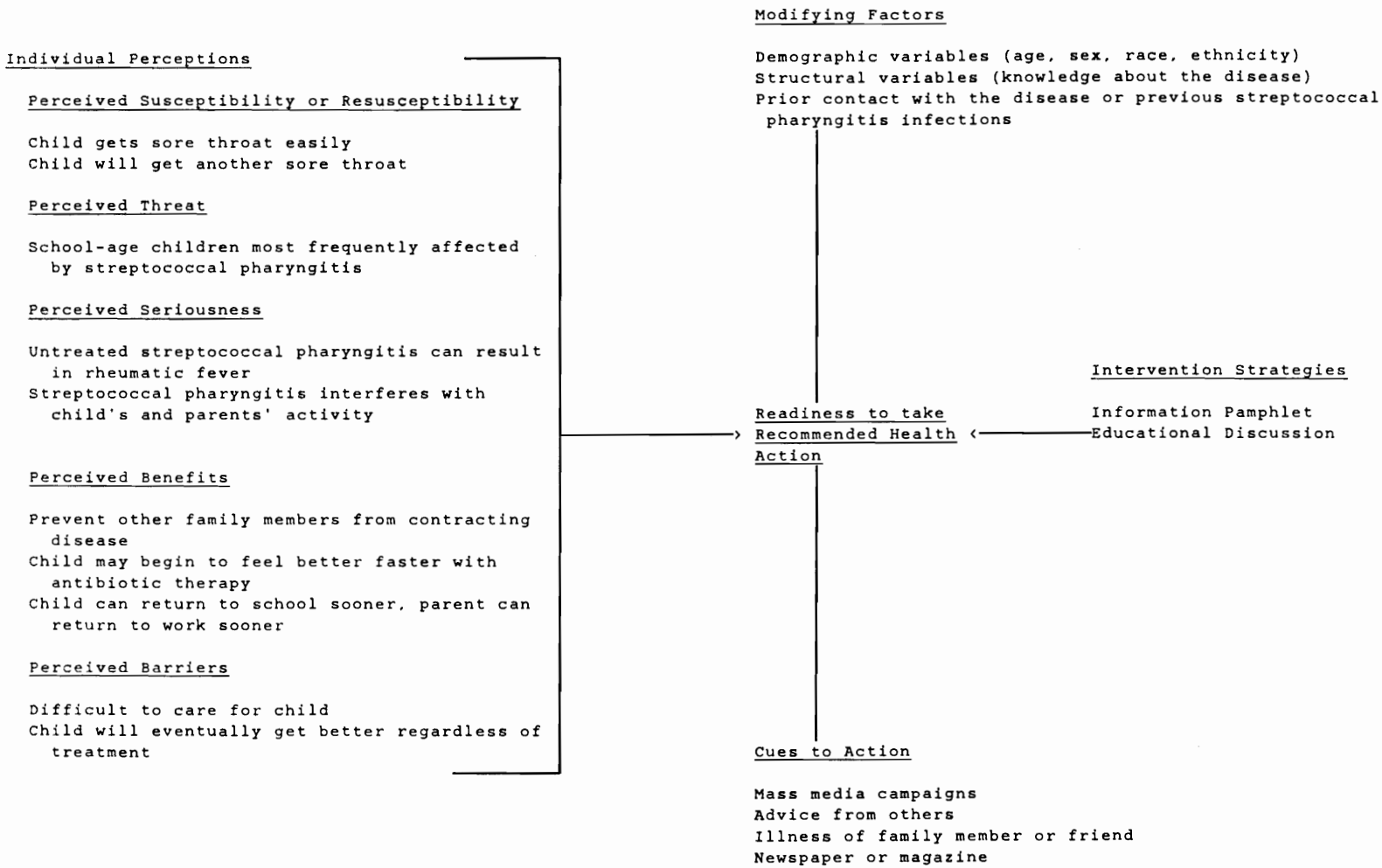

Figure. Adaptation of the health belief model (Adapted from Becker et al., 1972).

referred to the decision to obtain prompt medical care and was determined by the difficulty encountered in caring for a sick child and the parents belief that the sick child would get better regardless of treatment.

The other categories labeled modifying factors, intervention strategies and cues to action are more general in format and can apply to a wide range of illnesses. Questionnaire results were intended to provide information directly related to the variables listed within each category and gave an indication about the areas that could be improved through educational intervention.

In summary, the adapted HBM served as an organizational tool to categorize the responses of parents on different issues about streptococcal pharyngitis. This information allows the nurse to better assess the educational needs related to streptococcal pharyngitis and direct future intervention.

Research Questions

The following questions were investigated in this study:

1. What information do parents have regarding streptococcal pharyngitis?
2. What is the source of knowledge of parents information regarding streptococcal pharyngitis?
3. How are demographic variables associated with

level of knowledge about strep throat?

4. Is there a difference between what parents know regarding streptococcal pharyngitis and what some health care providers believe they need to know?

Operational Definitions

Information

Information is defined as the communication of knowledge, the content of which can be quantitatively measured.

Parents

Parents are the primary caretakers (mothers or fathers) who bring the child into a pediatric clinic.

Streptococcal Pharyngitis

Streptococcal pharyngitis is an infection of the throat caused by the Group A beta-hemolytic streptococcal organism. It affects primarily school-age children and classically presents with sudden onset of sore throat, fever, beefy red throat, pharyngeal exudate and tender anterior cervical nodes.

Source of Knowledge

The source of knowledge is the basic acquisition of information about streptococcal pharyngitis. This could be single or multiple in nature. Friends or relatives,

health professionals, media, or prior experience with the disease are considered possible sources of information about streptococcal pharyngitis.

Demographic Variables

Demographic variables are the different characteristics of the study population that are chosen for statistical analysis. Characteristics chosen in this study included parents' ages, child's age, number of children at home, level of education, marital status, annual income and race.

Level of Knowledge

The level of knowledge is the information parents have about strep throat determined by quantitatively measuring the number of correct answers on the questionnaire.

What Parents Know

"What parents know" was defined as the information parents have regarding streptococcal pharyngitis at the time the questionnaire is administered.

What Parents Need To Know

"What parents need to know" is the information regarding the course, treatment and complications of streptococcal pharyngitis that is deemed significant in the literature and by practicing health professionals.

This information, according to the health belief model, would have a positive influence upon parents accessing health care for children with sore throats.

CHAPTER IV

METHOD AND DESIGN

Subjects

The sample was composed of 100 parents who brought their children, regardless of diagnosis, to one of two pediatric practices. The two sites utilized were the University Pediatric Clinic and the Old Farm office of Willow Creek Pediatrics. Both sites were located in the Salt Lake City metropolitan area. These two sites were chosen because of their probable homogeneous nature. The SES profile of the patient population at both practices was assumed to be middle class as determined by the urban settings adjacent to, but not within, the inner city. No documented socioeconomic statistics were available on the University sample through either the medical records department or the outpatient clinic. However, the consensus of four medical personnel at the University clinic was that the patient clientele was middle class or lower middle class. Patient families seen for well child care or episodic visits were primarily of lower income, whereas patient families being seen for special system disorders such as renal, pulmonary, or endocrine problems were classified as being middle to upper middle class. The

dominant socioeconomic character of patient families seen at Willow Creek was stated to be middle class by two practicing health professionals. Again, no documented socioeconomic statistics were available. Also, the general population of Utah has tended to be homogeneous in composition. Minorities have comprised only a small percentage of the population in the metropolitan Salt Lake City area. True to the surrounding population, this study group had only a small percentage of minorities.

Procedure

At each site, the first 50 parents who brought children, ages 3-18, for a visit were asked to fill out a three-page questionnaire prior to seeing the physician. To answer the questions the parent needed to know how to read. Only those agreeing to answer the questions were accepted into the study. All of the parents asked to participate in the study did.

The first page of the questionnaire asked for demographic data. These data included the parents' name and address (allowing for an informational pamphlet to be sent if desired by the parent), years of formal education, marital status, family income, ethnic origin, child's age and number of children at home. The second page of the questionnaire was a series of true/false questions about the etiologies, course, treatment and complications of untreated streptococcal pharyngitis. The third page

continued this format and included questions on the parents' source of knowledge concerning streptococcal pharyngitis. The final question asked if the parent desired any additional information. If there was a positive response, educational material (a two-page pamphlet) was sent to the address listed on page one of the questionnaire.

Consent for participation in the study was obtained by the investigator prior to administration of the questionnaire. The questionnaires were collected by the receptionist or investigator as the parent left the office site.

Information believed most important for parents to have was determined by having an expert panel of five practicing health providers individually mark the questions on the questionnaire they believed to represent essential knowledge. The panel consisted of two nurse practitioners and three physicians. If a majority of the panel marked the question, it was determined to be important information about strep throat that the parent should know.

Instruments

The level of information parents had about streptococcal pharyngitis was evaluated by use of a questionnaire (see Appendix A). The questionnaire was developed by discussing with nurse practitioners and practicing

pediatric physicians what points were believed to be most important to include in a parent questionnaire. Factors that were mentioned frequently in the review of literature were also included. The questionnaire was approved by physicians in both practices utilized as data collection sites for the study. It was pilot-tested for validity in a group pediatric practice clinic prior to the beginning of the study.

CHAPTER V

RESULTS

A total of 120 parents participated in the study by agreeing to fill out the questionnaire. This number included 20 parents who formed the pilot test group and the remaining 100 who formed the sample population. The pilot study was conducted on 20 participants at the University of Utah Pediatric Clinic. No problems with clarity or format were noted during the pilot study. The first 50 questionnaires of the sample population were administered at the University of Utah Pediatric Clinic, while the latter 50 were administered at the Willow Creek Pediatric Clinic. The questionnaire was handed to the parent in the waiting area of one the two clinics prior to the physician seeing the patient. The author explained the study including the true-false questionnaire format, reviewed the consent form and was available to answer any questions on all 100 questionnaires. This avoided any variance between testing procedures. The time required to complete the questionnaire was approximately 5 minutes. A response rate of 99.7% was calculated based on the number of questions answered by the total sample.

Parental Information About Streptococcal Pharyngitis

The first research question investigated what information parents have regarding streptococcal pharyngitis. This question was answered quantitatively by dividing 23 true and false questions into three subcategories: treatment, diagnosis and susceptibility. Within each of the categories a mean, standard deviation and range was calculated, based on the number of correct answers. Parents scored highest on the questions concerning treatment. There were eight treatment questions, 86.9% of which were answered correctly by parents. Parents scored highest on the treatment question concerning antibiotic effectiveness (97%) and lowest on the question regarding complications of untreated strep throat (75%). Parents also scored well on two other treatment questions, regarding adverse reactions to penicillin (96%) and when to discontinue antibiotic treatment (95%) (Table 1).

Seventy-five percent of the questions on susceptibility were answered correctly. Parents scored best on the susceptibility question concerning repeated episodes of strep throat (98%) and poorest on the question about the etiology of bacterial versus viral pharyngitis (23%) (Table 2).

Ten of the 23 questions concerned diagnosis. Parents scored highest on the diagnostic question regarding throat

Table 1

Percentage Of Correct Answers On Questions About Treatment

Question		Percent
17	Antibiotics are effective only if taken as prescribed (correct frequency and dosage)	97
21	Occasionally (less than 1%), an individual will have an adverse reaction to penicillin	96
16	Once the child is free from a sore throat and acts well, it is O.K. to stop antibiotic treatment	95
15	Antibiotic therapy may make a child with strep throat feel better faster	87
20	Penicillin is the drug of choice for treating strep throat	83
23	A child with strep throat will eventually get better, regardless of treatment	82
19	Antibiotic therapy decreases the length of time a child with strep throat is contagious, allowing the child and parent to return to work sooner	80
1	Strep throat is important to treat since if untreated it can cause heart or kidney disease	75

Range = 3-8; Mean = 6.3; SD = +1.0

Table 2

Percentage Of Correct Answers On

Questions Of Susceptibility

Question		Percent
22	Repeated occurrences of strep throat are possible	98
18	Children with strep throat remain "contagious" until treated and can infect other family members and social contacts	87
12	Strep throat is spread from person to person through droplets or direct contact.	84
2	School-age children are most susceptible to strep throat	82
3	Sore throats are caused by numerous organisms, most of which are bacterial in nature and can be treated with antibiotics	23

Range = 1-5; Mean = 3.7; SD = +.8

cultures and the parental role in determining whether a child is positive for strep throat (97%). Participants scored poorest in this category, answering only 68% of all questions concerning diagnosis correctly (Table 3).

Sources of Parental Knowledge

Of the 97 parents who answered this question, 63% stated prior experience with the disease as the leading source of knowledge, followed by health professionals (62%) and friends or relatives (59%). Of the total sample population, 87% had prior experience with the disease (Table 4).

Demographic Variables

Six different demographic variables were investigated in the total study population including age of parent, child's age, number of children at home, ethnicity, marital status, income and education. The youngest parent answering the questionnaire was 18 years and the oldest was 57 years, with a mean age of 31.6 years (Table 5). The mean age for the child being seen as a patient was 6.3 years, with a range of 3 to 18 years (Table 6). The mean number of children at home was 2.8 with a range of 1 to 8 (Table 7).

The sample group was homogeneous for ethnicity with Anglo-Americans composing 94% of the population. The remaining 6% of the population was composed of Hispanics,

Table 3

Percentage Of Correct Answers On

Questions Of Diagnosis

Questions		Percent
13	Diagnosis of strep throat is made by throat culture obtained by swabbing the throat	97
4-10	Mark T beside those symptoms that might lead you to believe your child has strep throat:	
	tiredness	62
	fever of 38.2 C (100.4 F) or more	86
	abdominal pain or upset stomach	21
	runny nose	64
	headache	46
	sudden sore throat	93
	cough	51
14	The procedure for obtaining a throat culture is both uncomfortable and painful for children	82
11	Children who have a sore throat without any other symptoms may have strep throat	73
	Range = 3-10; Mean = 7.3; SD = +1.5	

Table 4

Parents' Source of Information About Strep Throat

(Willow Creek and University of Utah combined)

Source of information	N	Percent
Prior experience with disease	61	63
Health professionals	60	62
Friends or relatives	57	59
Media	15	16

Table 5

Parents' Ages (Willow Creek and University of Utah)

Age	Willow Creek	University
15-20 years	0	2
20-25 years	10	6
25-30 years	10	12
30-35 years	19	13
35-40 years	7	6
40-45 years	1	4
45-50 years	1	4
50-55 years	0	2
55-60 years	0	1
Range = 18-57; Mean = 31.6; SD = 7.6		

Table 6

Age of Child Being Seen for Office Visit

(Willow Creek and University of Utah)

Child's Age	Willow Creek	U. of Utah
3-6 years	32	25
6-9 years	9	6
9-12 years	4	8
12-15 years	1	5
15-18 years	2	4
Totals	48	48

Table 7

Number of Children at Home (Willow Creek and University Utah combined)

Number children at home	n
1-2 children	21
2-3 children	31
3-4 children	19
4-5 children	16
5-6 children	1
6-7 children	2
7-8 children	4
8-9 children	3

Afro-Americans and other ethnic origins (Table 8). The majority of the subjects were married (88%) and of the remaining unmarried group, 7 were single, 1 was separated and 4 were divorced. Nine participants did not respond to the question related to income. Of the 91% of participants who did respond to this question, 56% reported incomes of greater than $25,000. Fifty-eight percent of the population had educational experience beyond high school, 26% had completed high school and 14% had less than a high school education (Table 9).

Demographic Characteristics as Compared with Knowledge Level

Significance tests (two-tailed *t*-tests) and correlation coefficients tests were conducted comparing demographic variables and knowledge. Variables tested for correlation against level of knowledge included mother's age, child's age, number of children, level of education and annual income. Of the variables tested, only a low correlation was noted between income level and education and correct answers. No correlation was found to exist with other variables and the knowledge base. Married subjects scored significantly higher than unmarried subjects on the test ($p < .005$).

The investigator divided the total population into two groups according to clinic sites. A significant difference ($p < .005$) was found between the two clinic

Table 8

Ethnic Composition (Willow Creek and University of Utah combined)

Ethnic Group	n	%
Anglo-American	92	94
Hispanic	2	2
Afro-American	1	0
Other	4	4

Table 9

Educational Level of Parents (Willow Creek and University of Utah)

Education	Willow Creek	U. of Utah	Percent
Less than 7th grade	1	2	3
Junior high school	1	3	4
Partial high school	1	6	7
High school graduate	10	16	26
Partial college	18	10	28
College graduate	11	10	22
Postgraduate/professional	3	6	8
Totals	45	53	98

populations on the variable of income. The mean income in the University group was $17,200, while the mean income for the Willow Creek group was 23,400. At Willow Creek, 31 subjects (76%) reported an income greater than $25,000 (Table 10). Yet, when the entire sample of subjects was evaluated, only 56% claimed an income of greater than $25,000.

The knowledge base or number of correct answers was also higher at the Willow Creek practice site. This was statistically significant when compared with the University respondents ($p < .01$). The mean number of correct answers at the University of Utah was 16.7 and at Willow Creek was 18.0. However, there was no significant difference between education levels between the two clinics. Correlation between educational levels and income at each respective clinic and the responses on the questionnaire was also absent.

Knowledge About Streptococcal Pharyngitis Health Care Providers Believe Parents Should Know

Health care providers (HCPs) selected a total of 14 questions which they felt parents needed to know regarding streptococcal pharyngitis. Four of these questions focused on treatment, two on susceptibility and eight on diagnosis. A difference between parents' knowledge and what HCPs believed parents needed to know was found to exist on certain questions within each of these

Table 10

Annual Family Income (Willow Creek and University of Utah)

Income	Willow Creek	U. of Utah	Percent
Below 5,000	0	7	7
5,000-10,000	1	4	5
11,000-15,000	0	4	4
16,000-20,000	4	6	10
21,000-25,000	5	8	14
Above 25,000	31	21	56
Totals	41	50	

categories.

Two of the four questions concerning treatment showed a difference between what parents know and what HCPs thought they should know. Twenty-five percent of all parents surveyed were not aware of the complications of untreated strep throat. Twenty percent were not knowledgeable about how antibiotics impacted contagiousness and the ability of children and parents to return to work. HCPs believed the information addressed in both questions should be common knowledge for all parents.

This gap between what parents knew and what HCPs thought they should know was also seen in the susceptibility and diagnostic categories. Thirteen percent of all parents did not understand the role of antibiotic treatment in preventing the spread of streptococcal pharyngitis among family contacts. Six of the eight questions deemed important knowledge for parents revealed a surprisingly high percentage of incorrect answers. The percentage of incorrect answers on questions concerning symptoms which might lead a parent to believe their child had strep throat ranged from 27% to 97%. Specifically, parents were unclear as to the diagnostic implications of such symptoms as tiredness, abdominal pain or upset stomach, runny nose, headache, cough, or an absence of any of these symptoms might play in suggesting a child had strep throat. Indeed, a significant difference was

present in this category between what parents knew and what HCPs believed was important parental knowledge.

CHAPTER VI

DISCUSSION OF FINDINGS

Parental Information About Strep Throat

The total sample population scored best on the questions concerning treatment (87%) and poorest on questions concerning diagnosis (68%). The score on questions about susceptibility was 75%. The findings indicated that health providers are doing an adequate job of educating parents about the treatment of strep pharyngitis but need to significantly increase the amount of education directed toward diagnosis and susceptibility aspects of the disease.

The percentage of correct responses scored by the sample population studied was 75%. Six questions were of particular interest due to the low percentage of the total population which answered the questions correctly. The questions focused on the causes of pharyngitis (bacterial versus viral), and the treatment and symptoms that might help a parent think a child might have strep throat. The fact that a majority of parents (87%) believed most sore throats were bacterial in origin and treatable with antibiotics may have resulted in false expectations and

dissatisfaction when the parent left the office with no antibiotic prescription in hand. Parents could be made aware of the classical symptoms of strep throat in children yet cautioned that a persisting sore throat without the classical signs or symptoms warranted medical attention. Through parent education more responsibility for a child's preventive health care might occur.

Only 25% of all parents were aware of the importance of treating strep throat and possible complications of not treating the disease. This finding was interesting when 87% of the total sample population answered yes to having had prior experience with the disease. The dramatic decrease in rheumatic fever outbreaks since the onset of antibiotic therapy has undoubtedly removed the subject of strep pharyngitis from the media limelight. However, as a result of the resurgence of the disease in the Salt Lake valley alone, practitioners have needed to focus on educating parents (especially those whose child's chief complaint is "sore throat") about the serious complications of untreated strep throat infections. If adequate parent education were done, one would expect that the percentage of parents aware of the complications would be close to the percentage of parents who cited having had prior experience with the disease. An explanation for this discrepancy of percentages is that children were probably receiving a correct diagnosis and treatment, but

practitioners were failing to educate parents about how the diagnosis was achieved, symptoms of the disease and complications of bacterial (streptococcal) pharyngitis.

Source of Parental Knowledge

The majority of those studied cited prior experience with the disease as their primary source of knowledge concerning strep throat (63%). However, health professionals were the source of information for 62% of the sample population. This information indicated that parents in this study gained a significant proportion of knowledge about strep throat from health care professionals. Educators and preventive health care advocates should impart information about the disease to parents of school-age children.

Demographic Variables

The lack of response by 9 parents to the question concerning annual income could be explained by a need for confidentiality. The difference in annual incomes between the two clinic sites might be understood by analyzing the nature of the two practices. University practices often tend to take more nonpaying patients than private practices such as Willow Creek. Income levels may also reflect the type of patient attracted to a private rather than University setting.

Demographic Variables Correlated with Knowledge

A higher number of correct answers was obtained from the Willow Creek practice. Years of formal education does not explain this phenomenon since no significant difference was noted in educational level between the two practices. The issue of established trust between the health care provider and patient might be responsible for parents obtaining increased knowledge about strep throat. Interfacing with a variety of health care providers may be more commonplace at the University setting than at the Willow Creek practice where encounters with a consistent single health care provider are the usual practice. A sense of trust secondary to a well-established relationship with a child's primary health care provider may foster better communication, including an atmosphere open to more questions and answers, between parent and provider. This explanation may account for the difference between higher scores at the Willow Creek practice. Income level did not correlate with educational level.

Higher income and educational level did not show a strong correlation with knowledge. This is explained by the homogeneous composition of the populations studied. Married subjects scored significantly higher than unmarried subjects. A possible reason for this outcome was that married parents may have more children than unmarried subjects and subsequently more experience and knowledge

concerning strep throat.

Knowledge About Streptococcal Pharyngitis Health Care Providers Believe Parents Should Know

There did exist a meaningful difference on six answers concerning diagnostic symptoms. Greater than 27% of all parents answered these six questions incorrectly. Parents scored poorest on questions about diagnosis, yet HCPs believed this category to be most important with regard to parents' knowledge concerning streptococcal pharyngitis. An interpretation of these results might be that parents lacking sufficient information about symptoms may be less likely to seek health care. This parental decision not to seek health care might be based on the misconception that a sore throat, even when accompanied by other symptoms, is not serious. A hidden reservoir of disease may be present in school-age children because parents act out of ignorance in failing to seek health care. This reservoir may form the nucleus for epidemics of strep throat.

A difference between what HCPs believe parents should know and what they did know was also revealed in the questions on diagnosis. A higher percentage of children are placed at medical risk of acquiring both suppurative and nonsuppurative complications of strep throat because of parents' ignorance regarding the disease and its potential complications. Parents would be motivated to

seek health care sooner if knowledge about potential rheumatic fever and kidney disease were widely disseminated. A deficit and difference in parents' knowledge concerning the impact early antibiotic treatment has on school and work absences also surfaced. It is conceivable that this knowledge alone and the documented financial loss from missed employment would act as an impetus for early antibiotic treatment.

Questions concerning susceptibility also showed a difference between what parents deemed important and what HCPs believed important. Thirteen percent of all parents surveyed did not have knowledge of the role antibiotics play in preventing the spread of strep throat among family contacts. Prompt medical treatment of a child with potential strep throat may be delayed if a parent believes the disease to be isolated in only one family member. The fact that all family members are at increased risk of contracting strep throat when one family member is infected needs to be explained not only in terms of illness, but also in terms of lost wages and extra avoidable medical visits and expenses. It is hoped that this knowledge will increase parents future responsibility in maintaining quality preventive health behaviors.

Summary

A review of the literature revealed that streptococcal pharyngitis has remained of great concern to the health practitioner because of the serious sequelae if allowed to go untreated. Present knowledge is based on the fact that rheumatic heart disease was always preceded by an untreated episode of strep throat. A significant proportion of individuals that developed the complication of rheumatic fever had no memory of any preceding illness.

Health care providers have historically agreed on the need for accurate diagnosis and treatment of streptococcal pharyngitis because of its serious sequelae of rheumatic fever. A review of the literature revealed no studies that have been done to assess the knowledge parents have about strep throat.

According to the Health Belief Model an individual must possess a minimal level of knowledge prior to initiating health care. This study evaluated what information parents had about the treatment, susceptibility and diagnosis of streptococcal pharyngitis and the source and accuracy of this knowledge. Demographic variables and knowledge were also analyzed to determine if any associations existed. Lastly, differences between what parents know and what health care providers believe parents should know was studied.

The sample was composed of 100 parents of children

who visited the Willow Creek and University of Utah Pediatric Practices. At each site the first 50 parents who brought children, ages 3-18 for an episodic or well-child visit were asked to fill out a three-page questionnaire prior to seeing the physician. The questionnaire was composed of 23 true and false questions which focused on the treatment, susceptibility and diagnosis aspects of strep throat. Information believed most important for parents to have was determined by an expert panel of five practicing health care providers. Questions from the questionnaire were believed important if a majority of the panel marked the question.

Parents scored highest on questions concerning treatment (87%). Seventy-five percent of the questions on susceptibility were answered correctly. Parents scored lowest on questions about diagnosis (68%). The leading source of knowledge about strep throat for parents was prior experience with the disease (63%).

Assumptions about the homogeneous nature of the Willow Creek and University practices were overall supported by demographic results. The only variable that proved not to be homogeneous was income. The mean income at Willow Creek was $5,200 higher than at the University.

A low correlation was noted between income level and education versus correct answers. No correlation existed with other demographic variables and knowledge base. A

significant difference ($p < .005$) was found between the two clinic populations on income. No significant difference in education was noted between the two clinics though the Willow Creek Practice scored higher than the University subjects in total number of correct answers.

A difference between parents' knowledge about streptococcal pharyngitis and what health care providers believed parents needed to know concerning the disease was found to exist on certain questions within the treatment, susceptibility and diagnostic categories.

Limitations

Several limitations existed with this study and the descriptive format. Inference of causal associations was impossible considering the type of information obtained and the statistics used. Participants in the study were not selected randomly which posed problems in generalization to a larger population. The ability to generalize results of the study is also limited since only two clinic settings were used. Greater diversity in the number of clinics utilized and randomly assigning participants would have increased the ability to generalize results to a larger population.

The results obtained from both the income and ethnic demographic questions would also pose problems with regard to generalization. A disproportionate 57% of all parents answering the questionnaire fell into the greater than

$25,000 income category. Ethnic background was also extremely disproportionate with 94% of the total population being Anglo-American. However, this is not atypical for the Utah geographical area where approximately 95% of the state's population is Caucasian. As a result, information gained from this study could only be generalized to a similar community.

Recommendations for Further Study

Suggestions for replicating this study would include selecting a larger number of clinics in order to obtain a better cross-section of the Utah population. A second recommendation would be random selection of participants which could be accomplished by pulling files of pediatric patients ages 3-18 and then using a table of random numbers to select parents of the patients who would be contacted by telephone for the study. Another suggestion would be selection of a sample population with greater ethnic diversity. A large percentage of the sample (57%) reported income levels in the greater than $25,000 category. Future studies should add a minimum of three more income categories, with the highest income category greater than $40,000.

Additional aspects of this study could be investigated for purposes of obtaining information about streptococcal pharyngitis and better defining the population groups needing education. A study comparing know-

ledge about streptococcal pharyngitis between pediatricians and family practice providers might reveal a different socioeconomic make-up and knowledge base. Preselecting clinic sites in which the clientele is known to have a low socioeconomic status might reveal an extremely low knowledge base and concentrated need for preventive health teaching. A similar study could be performed utilizing the same questionnaire tool to assess teenagers' (ages 13 to 18) knowledge about strep throat. This information would aid in determining health awareness of the adolescent population and the education needs. The amount of knowledge gained could be evaluated by utilizing a pre- and posttest design after introducing an informational pamphlet as the independent variable. It is unknown whether pamphlets will prove to be an effective means of educating parents or a poor choice.

Implications for Nursing

The results of this study have important implications in areas of nursing practice, research and education. Assessing parental education needs is the first step in identifying long-term educational needs. This study revealed that parents of school-age children lacked sufficient knowledge about the subject of strep throat and could benefit from additional knowledge. Health professionals were given as the primary source of knowledge about strep throat. However, a significant number of

parents were still ignorant about the various aspects of the disease, especially diagnosis which is the most important link in the prevention of strep throat. Possibly, the parent did not possess enough knowledge to ask the appropriate questions. Nurse practitioners and nurses who practice in pediatric settings could easily provide this important education by teaching parents about various aspects of strep throat. A simple one-page handout could be given to parents whose children were being seen with the chief complaint of "sore throat."

A significant contribution in the area of preventive health maintenance could be accomplished through an educational endeavor. Conceivably, millions of dollars could be saved by children returning to school sooner and working parents being able to return to their respective jobs sooner. Educational interventions might also prevent possible epidemics. There always remains the unfortunate child who acquired rheumatic heart disease, which might have been avoided through educational efforts of health care providers.

APPENDIX A

CONSENT FORM

I, Sharon Hillard, R.N., a Master's in Nursing student at the University of Utah, am studying parents' knowledge about strep throat. Your participation will benefit the subsequent care of future children.

Completing the questionnaire is voluntary and will not affect your child's care. Your anonymity and privacy will be maintained. Your name and address are optional depending on your desire to receive a pamphlet about strep throat by mail.

If you are willing to participate in this study please give your consent by filling out the questionnaire. If you have any questions, please contact me at 485-1008. If a problem arises that needs further discussion, you may contact the Institutional Review Board Office at 581-3655. A copy of the consent will be given to you.

Please return the completed questionnaire to me before your child's exam. Thank-you very much for your help.

Sharon K. Hillard, R.N.
University of Utah-College of Nursing

APPENDIX B

QUESTIONNAIRE

Circle T if statement is true and F if statement is false.

1. T F Strep throat is important to treat since if untreated it can cause heart or kidney disease.

2. T F School-age children are most susceptible to strep throat.

3. T F Sore throats are caused by numerous organisms, most of which are bacterial in nature and can be treated with antibiotics.

4-10. Mark T beside those symptoms that might lead you to believe your child has strep throat:

_____ tiredness
_____ fever of 38.2° C (100.4° F) or more
_____ abdominal pain or upset stomach
_____ runny nose
_____ headache
_____ sudden sore throat
_____ cough.

11. T F Children who have a sore throat without any other symptoms may have strep throat.

12. T F Strep throat is spread from person to person through droplets or direct contact.

13. T F Diagnosis of strep throat is made by throat culture obtained by swabbing the throat.

14. T F The procedure for obtaining a throat culture is both uncomfortable and painful for children.

15. T F Antibiotic therapy may make a child with strep throat feel better faster.

16. T F Once the child is free from a sore throat and acts well, it is O.K. to stop antibiotic treatment.

17. T F Antibiotics are effective only if taken as prescribed (correct frequency and dosage).

18. T F Children with strep throat remain "contagious" until treated and can infect other family members and social contacts.

19. T F Antibiotic therapy decreases the length of time a child with strep throat is contagious, allowing the child and parent to return to work sooner.

20. T F Penicillin is the drug of choice for treating strep throat.

21. T F Occasionally (less than 1%), an individual will have an adverse reaction to penicillin.

22. T F Repeated occurrences of strep throat are possible.

23. T F A child with strep throat will eventually get better, regardless of treatment.

Related Questions

Has any member of your family or friend ever had strep throat?

Yes _____ No _____

What has been your source of knowledge concerning strep throat:

_____ A. Friends or relatives
_____ B. Health professionals (physicians, nurses, other)
_____ C. Media (magazines, newspapers, radio, T.V.)
_____ D. Prior experience with the disease

If you are interested in more information regarding strep throat, please print your name and address below and a hand-out will be mailed to you.

APPENDIX C

INFORMATIONAL PAMPHLET

Cause

Sore throats or pharyngitis is a common problem in children, accounting for over 30 million office visits annually. There are numerous causes for sore throats and, in many cases, the cause remains unknown.

As you may know, some sore throats are caused by organisms (bacteria) that are killed by taking antibiotics, and some are caused by a bacteria called streptococcus. Due to its bacterial nature, strep throat is treatable by antibiotics. It is important to treat this infection in order to prevent the development of rheumatic fever (which can damage the heart) or kidney disease.

Symptoms

In older children (over 3 years of age), the disease is characterized by any single or combination of the following symptoms:

sore throat-without runny nose or cough. Throat may appear inflamed or very swollen with or without visible stippling with or without exudate or bright red with stippling.

fever-temperature greater than 100.5° degrees F. Strep infections produce temperatures of 102-103° F and rarely temperatures as high as 104-105° F.

nausea or vomiting
headache
tiredness.

In some cases, the above symptoms may be minimal making it difficult to confirm a diagnosis without the standard throat culture (mentioned under treatment).

Who Is Affected?

Anyone from a newborn to the elderly can get strep throat. However, those between the ages 5 and 15 are the most susceptible.

Diagnosis

Certain signs and symptoms may highly suggest the presence of strep throat. Although these signs and

symptoms may suggest strep throat, the only accurate method of determining strep throat is by throat culture. A child is determined to have strep throat when the culture comes back positive. The result of the culture may be immediate (while you wait it the office) or take 24 hours. If the culture is positive, your child will be placed on antibiotic therapy.

A throat culture is obtained by aggressively swabbing the back of the throat. A good throat swab is critical to proper diagnosis. Assistance in holding a young child may be required. The procedure may be uncomfortable but not painful for the child as the gag reflex is usually elicited.

Treatment

Treatment for strep throat consists of oral or intramuscular administration of penicillin. The oral form of medication is taken 3 or 4 times daily for 10 days. For those patients allergic to penicillin, other medications are available. These include erythromycin and cephalosporins. A serious allergic reaction occasionally occurs with the penicillin injection. Only 1% of all patients have an acute reaction. The total antibiotic cost for a 10-day course of oral penicillin runs about $5.00 The intramuscular injection costs approximately $8.00.

Complications

Minor complications include infection of the sinuses, middle ear infection, abscesses of the tonsils (peritonsillar abscess) and throat (retropharyngeal abscess). Major complications include the development of heart disease (rheumatic fever) that can lead to death and kidney disease (acute glomerulonephritis).

Follow-up

No follow-up is necessary unless the child is symptomatic (still has a sore throat) after a 10-day course of antibiotics.

Remember

Follow medication instructions as prescribed. Give correct dosage and frequency prescribed for full 10 days.

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